

A REVIEW OF THE GOBIID FISH GENUS *MONISHIA* SMITH, 1949, FROM THE WESTERN INDIAN OCEAN AND RED SEA, WITH DESCRIPTION OF A NEW SPECIES

Menachem Goren¹

ABSTRACT. Five species have been included in the gobiid fish genus *Monishia* Smith, 1949: *M. william* (Smith, 1947); *M. oculata* Smith, 1959; *M. sordida* Smith, 1959; *M. ochetica* (Norman, 1927); *M. bulejiensis* Hoda, 1983. These species are compared and re-described. *M. adamsoni*, a new species from Pakistan, is described; it is characterized by having 12 segmented dorsal rays, 22 pectoral rays (upper 6 free) and 38–39 scales along the body.

INTRODUCTION

The genus *Monishia* Smith, 1959, is known from the western Indian Ocean and the Red Sea (Smith, 1959; Miller, 1973; Goren, 1979); Smith (1959) included three Indian Ocean species: *M. william* (Smith, 1947), type species; *M. oculata* Smith, 1959; and *M. sordida* Smith, 1959. Other species subsequently assigned to *Monishia* are: *Gobius ocheticus* Norman, 1927, from the Suez Canal (Miller, 1973, 1978), and *Cabillus anchialinae* Klausewitz, 1975, from the northern Red Sea (Goren, 1979). The latter is synonymized with *M. ochetica* in this paper. An additional species, *M. bulejiensis* Hoda, 1983, was described from Pakistan. Yet another species discovered during a study of gobies from the Pakistan coast, is herein described.

Smith (1960) placed in *Monishia* the South African species *Gobius saldanha* Barnard, 1927; Talbot and Penrith (1965) transferred it to *Ctenogobius*. Winterbottom (1976), who placed it in "the overlaid catchall genus *Gobius*," noted that *G. saldanha* shows certain similarities to *Monishia* and may ultimately be placed in that genus. Miller (1978) suggested the removal of *saldanha* to *Caffrogobius* or *Gobius*; Hoese and Winterbottom (1979) assigned the species to *Nematogobius*. Further research is needed to clarify the taxonomic affinities of *saldanha*; however, I do not consider the species to be a member of *Monishia*. Miller (1978) suggested that *Ctenogobius godavariensis* Rao, may belong to *Monishia*; unfortunately, I could not obtain specimens to confirm or reject this suggestion. Hoese and Winterbottom (1979) provisionally included *Acentrogobius simulus* Smith, 1960,

in *Monishia*; however, I do not place it there as it has a scaled predorsal and the upper rays in its pectoral fins are not free.

The species of *Monishia* resemble each other in morphology and color pattern, probably due to the similarity of the habitats they populate. The fishes that belong to this genus are small, usually 30–40 mm in total length, never longer than 60 mm. The genus is characterized by having the upper rays of the pectoral fins free (at least partly) and filamentous. The pelvic fins are fully united with a well-developed fraenum. The caudal fin is rounded and shorter than the head. Scales along the body 26–40. Most of the scales are ctenoid; only the anterior ones are cycloid. The scales reach a line from the upper base of the pectoral to a point on the first dorsal fin base, usually its insertion. The head, predorsal, and preopercular regions are naked. Vertebrae (including ural centrum) 27 (in two individuals of *O. ochetica*, 28). The lateral line system consists of cephalic canals with pores and rows of sensory papillae. The cephalic pore system consists of the following: a pair of nasal pores; unpaired anterior and posterior interorbital pores; pairs of supra-otic, antero-otic, postero-otic, and intertemporal pores. All of these pores open along a continuous canal. The anterior and posterior temporal pores open in a separate canal, except in *M. sordida* in which all of the above-mentioned pores are connected. Three preopercular pores, on the posterior margin of the preopercle, are connected by a canal. The sensory papillae are arranged mostly in vertical rows with two horizontal rows on the cheek, two on the opercle, and a discontinuous row above the opercle and the pectoral base. The structure of the lateral line system of each species is illustrated in the figures.

The genus *Monishia* is closely related to *Heteroleotris* Bleeker, 1874, and *Coryogalops* Smith, 1958. Each of the three genera has a depressed head, unscaled head and nape, 4–6 vertical, and 1–2 horizontal rows of papillae on the cheek

¹ Department of Zoology, George S. Wise Faculty of Life Sciences, Tel Aviv University, Tel Aviv 69978, Israel.

Table 1. A summary of selected diagnostic characters in six species of *Monishia*.

	<i>ochetica</i> n = 47	<i>oculata</i> n = 6	<i>sordida</i> n = 8	<i>william</i> n = 10	<i>adamsoni</i> n = 3	<i>bulejiensis</i> n = 5
Scale alone body	26–31	30–33	34–36	34–36	38–39	31–33
Transverse scale rows	8–9	11	12–13	9–10	10–11	9–10
Segmented rays in second						
dorsal fin	10–11 (12)	9	11	(10) 11	12	11
Segmented rays in anal fin	9–10	8	9	9	9	9
Pectoral rays	16–18	17–18	22	22–23	22	20
Free pectoral rays	2	3–4	5	6–7	6	5
Gill rakers	1+1+5	1+1+4	1+1+6	1+1+4	1+1+6	1+1+6
Vertebrae (including						
urostyle)	27 (28) (n = 14)	27	27	27	27	27
Scales on pectoral base	–	–	+	–	–	–

arranged in a similar pattern. In addition the first gill slit of *Heteroteotris* is closed by a membrane as in *Monishia* (at least partly). The cephalic pore system of *Coryogalops* is similar to that of *Monishia william*. *Monishia* differs from *Heteroteotris* in possessing ctenoid scales (vs. cycloid or naked body), in having gill rakers on the anterior gill arch (vs. none) and in the interorbital pore being always unpaired holes (vs. tubular, mostly paired pores). *Coryogalops* differs from *Monishia* in having the first gill arch completely free, posterior nostril a hole (vs. tubular) and pelvic fins completely separated, with the tips of the rays free.

Little is known of the biology of the species of *Monishia*. My specimens were all taken in shallow water, usually less than 2 m deep, although a few specimens of *M. ochetica* were collected at a depth of 8 m (in artificial reefs). The fish seems to be resistant to extreme ecological conditions. *M. ochetica* was found in Lake Timsah, Suez Canal, where temperatures fluctuate from 14 to 26.5°C and salinity from 30 to 50 parts per thousand (Miller, 1978). *M. anchialinae* was found for the first time in the hyperhaline water bodies of the Cracks at Ras Muhammad, Sinai Peninsula (Klauswitz, 1975). *M. william* was found in brackish water at the mouth of Nora River, southeast Africa, as well as in other localities and habitats (Winterbottom, 1976). The species that is described here as new was found in tidal pools. The diet of *M. william* consists of amphipods, isopods, polychaetes, and occasional decapods and mollusks (Winterbottom, 1976). Very little is known about the reproductive behavior of the genus. The only available information refers to *M. sordida*: "... apparently male, indicates buccal incubation, for its mouth is full of eggs, similar to those found in a female" (Smith, 1959: 207).

METHODS AND MATERIALS

Specimens from the collections of the following institutions were studied: British Museum (Natural History), London (BMNH); Hebrew University of Jerusalem (HUJ); Natural History Museum of Los Angeles County (LACM); J.L.B.

Smith Institute of Ichthyology, Grahamstown (RUSI); Senckenberg Museum of Frankfurt (SMF); Zoological Museum of Tel Aviv University (TAU).

Counts of vertebrae were made from X-ray photographs taken for all the listed material in this work excluding *M. ochetica*, of which only 14 specimens were photographed (TAU 7606, 5 spec.; TAU 6206 + TAU 6211, 5 spec.; TAU 5592, 1 spec.; HUJ 7571, 3 spec.).

X-ray photographs were also used to verify the counts of the spines and rays in the dorsal and anal fins.

All measurements and counts given in the text and the tables are based on the material examined and listed. Measurements are given in mm. In cases in which the total length could not be measured due to a damaged caudal fin, TL is followed by ?.

The lists of synonyms include only publications in which the taxonomy of a species is discussed or changed, or in which additional information about the species is provided.

COUNTS. A, D, P, V—anal, dorsal, pectoral, and pelvic fins, respectively; the posterior bifid ray of second dorsal and anal ray counted as one.

MEASUREMENTS. BD—body depth at the insertion of the first dorsal fin; GR—number of gill rakers on anterior gill arch; HL—head length from snout tip to upper attachment of opercular membrane; LS—longitudinal scale counts from upper attachment of the opercular membrane to the end of the hypural; SL—standard length; TL—total length; TR—number of transverse scale rows, counted from the origin of second dorsal fin.

KEY TO SPECIES OF *MONISHIA*

1. Pectoral fin base with scales. *M. sordida* Smith
- . Pectoral fin base naked 2
2. Dorsal segmented rays 9; anal segmented rays 8
- . Dorsal segmented rays 10–12; anal segmented rays 9–10 *M. oculata* Smith
- . Dorsal segmented rays 10–12; anal segmented rays 9–10 3

3. LS scales 38–39; segmented dorsal rays 12 *M. adamsoni* n. sp.
- . LS scales fewer than 37; segmented dorsal rays 10–11 (rarely 12, but then LS fewer than 32) 4
4. LS scales 26–30; pectoral fin rays 16–18 *M. ochetica* (Norman)
- . LS scales 32–36; pectoral fin rays 20–22 5
5. A tentacle on posterior part of upper margin of eye *M. bulejiensis* Hoda
- . No tentacle on posterior part of upper margin of eye *M. william* (Smith)

Species are also distinguished in Table 1.

SPECIES ACCOUNTS

Monishia adamsoni new species

Figures 1a, 2, 4a

MATERIAL EXAMINED. Holotype. LACM 38320-23, TL 41.4 mm, SL 35.0 mm; Pakistan, Sind, small cove 4.8 km west of Nuclear Power Plant, 13.II.1979, in shallow water (to 2 m), rocky bottom with sandy pockets. Paratypes. TAU 8800, TL 42.1 mm, SL 35.5 mm, data as for holotype; LACM 38310-26, TL 36.3 mm, SL 30.7 mm; Pakistan, Sind, Beluji Point, 27.I.1979, tidepool, shallow water (to 60 cm), conglomerate bed with rocky rubble.

ADDITIONAL MATERIAL. RUSI 74-91 (part), 1 ex., TL 20.5 mm, SL 17.1 mm, South Africa, Beauchamp, 1 mile E on road near Tacotet Bay, 0.3 miles E of St. Marie Bridge at jutting head of the island, 6.III.1971.

ETYMOLOGY. This species is named in honor of Thomas A. Adamson (formerly of the Natural History Museum of Los Angeles County) for his genuine interest in Indo-West Pacific fishes and his valuable contributions to ichthyology.

DIAGNOSIS. A *Monishia* with 12 segmented rays in second dorsal fin; pectoral rays 22, the upper 6 free; filamentous; scales along body 38–39; gill rakers 1+1+6. In addition *adamsoni* has a distinctive arrangement of the rows of sensory papillae on head (Fig. 4a). Comparisons are presented in Table 1.

DESCRIPTION (based on holotype and 2 paratypes). Body elongate and compressed. Head depressed, its upper profile moderately convex. Mouth almost horizontal. Maxillary reaches level of front of eye. Three to four rows of teeth on each jaw, outer teeth on both jaws and inner teeth on lower jaw enlarged. A pair of curved canines on the sides of the outer teeth row on lower jaw. Tongue truncate with a slight median emargination. Posterior nostril a short tube at front of eye. Anterior nostril a long tube, with a tentacle on top, overhanging labial groove. Eyes of moderate size, interorbital space narrow. Gill opening restricted, reaching to below pectoral base. Gill rakers short 1+1+6.

Body proportions presented in Table 2.

Fins. D VI, 1 12; A I 9; P 22—upper 6 rays free; the first fin is little shorter than the second, which is about two thirds of body depth. Pectoral fins rounded, not reaching level of insertion of the second dorsal fin. Pelvic fins fully united with a well-developed fraenum. The pelvies do not reach the anus.

Anal fin inserts below third segmented dorsal ray. Its height about two thirds of body depth. Caudal fin rounded.

Scales. LS 38–39; TR 10–11; body scales ctenoid, except for the three–four anterior transverse rows. Predorsal and prepelvic regions, pectoral base, and mid belly completely naked. Vertebrae (including ural centrum): 27.

Cephalic lateral line system. Position and number of pores and papillae as in Figure 4a.

Color (preserved). Body and head brownish, covered with irregular dark speckles. A dark blotch on the upper base of the pectorals and a vertical dark band on the base of the caudal fin. First dorsal fin with two oblique large dark bands. The upper tip of the fin white. Second dorsal fin brownish.

Monishia bulejiensis Hoda, 1983

Figures 1b, 3, 4b

Monishia bulejiensis Hoda, 1983a:111–115; 1983b:143–147.
Type locality: Karachi coast, Pakistan.

MATERIAL EXAMINED. LACM 38310-27 (2 ex.), TL 35.5–38.1 mm, SL 29.8–31.5 mm; TAU 8801 (2 ex.), TL 32.7–36.5 mm, SL 27.2–30.1; LACM 38309-22, TL 31.3

Table 2. Measurements and body proportions of the types of *Monishia adamsoni* n. sp.

	Holotype (LACM 38320-23)	Paratype (TAU 8800)	Paratype (LACM 38310-26)
Total length (mm)	41.4	42.1	36.3
Standard length (mm)	35.0	35.5	30.7
Body depth (mm)	7.2	7.6	6.1
Head length (mm)	10.6	11.2	8.5
Head width (mm)	8.6	8.7	6.7
Standard length (% of TL)	84.5	84.3	84.5
Body depth (% of SL)	20.5	21.4	19.7
Head length (% of SL)	30.3	31.5	27.7
Head width (% of SL)	24.6	24.5	21.8
Head depth (% of SL)	20.0	19.1	18.6
Distance between snout and first pectoral fin (% of SL)	39.1	37.4	38.1
Distance between snout and second pectoral fin (% of SL)	57.4	58.3	57.0
Distance between snout and anal fin (% of SL)	62.8	61.9	62.3
Eye diameter (% of SL)	8.0	8.7	8.4
Longest pectoral ray (% of SL)	19.1	19.1	18.2
Longest spine in first dorsal fin (% of SL)	11.1	12.9	12.0
Longest ray in second dorsal fin (% of SL)	12.8	14.6	13.7
Longest anal ray (% of SL)	14.0	14.3	13.0
Head width (% of HL)	81.1	77.6	78.8
Eye diameter (% of HL)	26.4	27.6	26.8

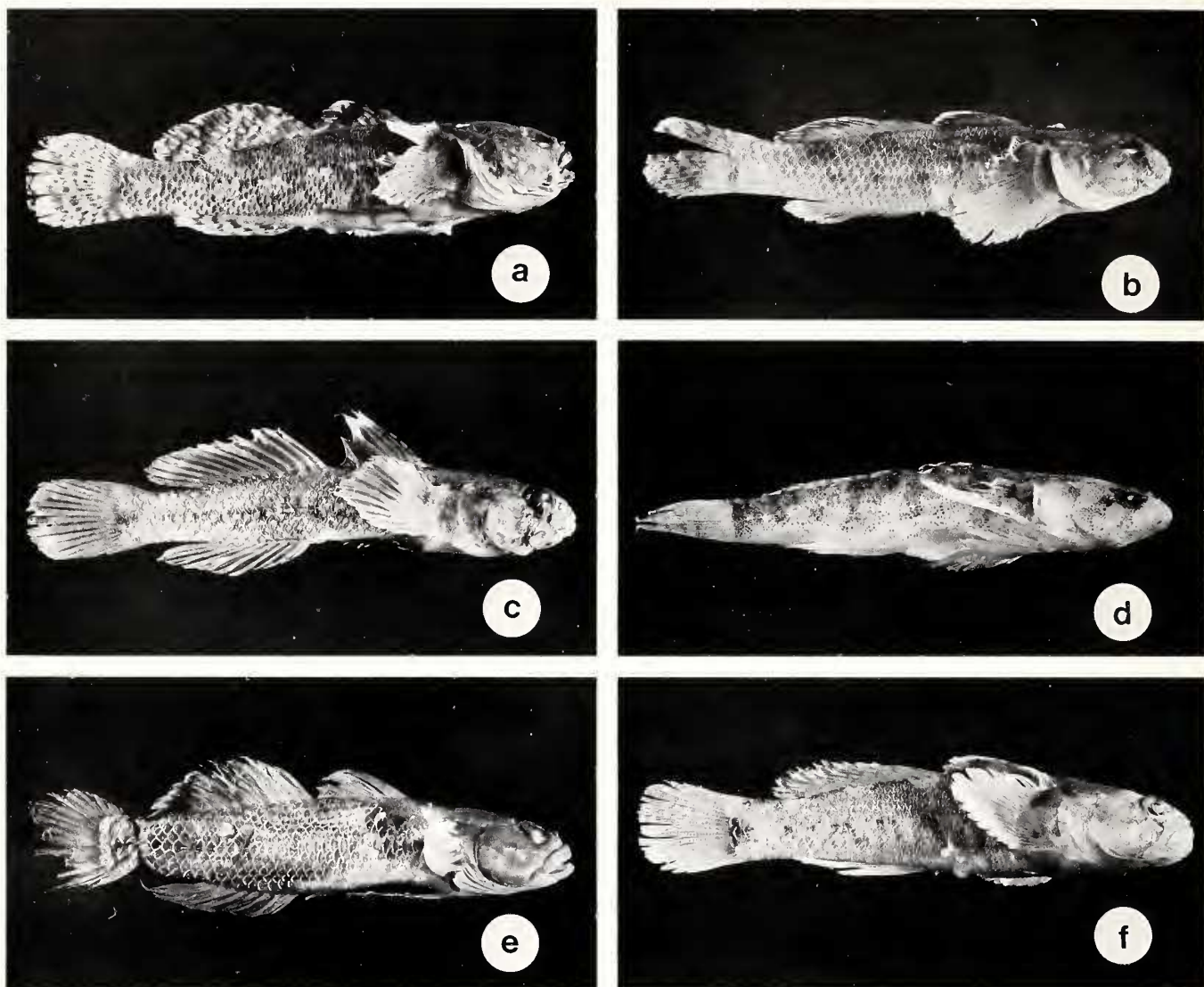


Figure 1. Photographs of six species of *Monishia*. a) *M. adamsi* n. sp. Holotype LACM 38320, SL 35.0 mm. Sind; Pakistan. b) *M. bulejiensis* LACM 38310, SL 31.5 mm. Sind; Pakistan. c) *M. ochetica* TAU 7607, SL 45.7 mm. Ras Muhammad, Sinai Peninsula. d) *M. oculata* RUSI 830 (Paratype), SL 20.5 mm. Baixo Pinda. e) *M. sordida* RUSI 823 (Paratype), SL 37.5 mm. Inhaca Islands. f) *M. william* TAU 8803 (formerly RUSI 74-329), SL 32.5 mm. Coffee Bay. Photographs by L. Maman.

mm, SL 26.3 mm; LACM 38210 and TAU 8801 were collected in Pakistan, Sind, Beluji Point, 27.I.1979, in shallow water (to 60 cm) (tidepool), conglomerate bed with rocky rubble. LACM 38309 was collected in Pakistan, Sind, Beluji Point (300 m WNW of the point), shallow water (tidepool—0.15 cm), conglomerate bed, 27.I.1979.

DIAGNOSIS. A *Monishia* with 11 segmented rays in second dorsal fin and 9 in anal fin; pectoral rays 20, the upper 6 free and filamentous; scales along body 31–33; transverse scale rows 9–10; a small tentacle on the upper posterior edge of the eye. Possession of this tentacle distinguishes *M. bulejiensis* from all known *Monishia*. In addition *M. bulejiensis* has a distinctive arrangement of the rows of sensory papillae (Fig. 4b). Comparisons are presented in Table 1.

DESCRIPTION (based on all specimens listed). Body elongate and compressed. Head depressed, its upper profile convex. Mouth oblique. Maxillae reach to level of mid eye. On the upper posterior part of eye, just within the margin, is a short cylindrical pointed tentacle, an outgrowth of the sclerotic coat, its length equal to the length of the anterior nostril. Each jaw with 3–4 rows of teeth, the outer teeth on each jaw enlarged. No canines. Tongue truncate. Gill opening restricted, reaching to below pectoral base. Gill rakers 1 + 1 + 6. Vertebrae (including ural centrum): 27.

Cephalic lateral line system. Position and number of papillae as in Figure 4b.

Body proportions presented in Table 3.

Fins. D VI, I 11; A 19; P 20, upper 5 rays free. First dorsal

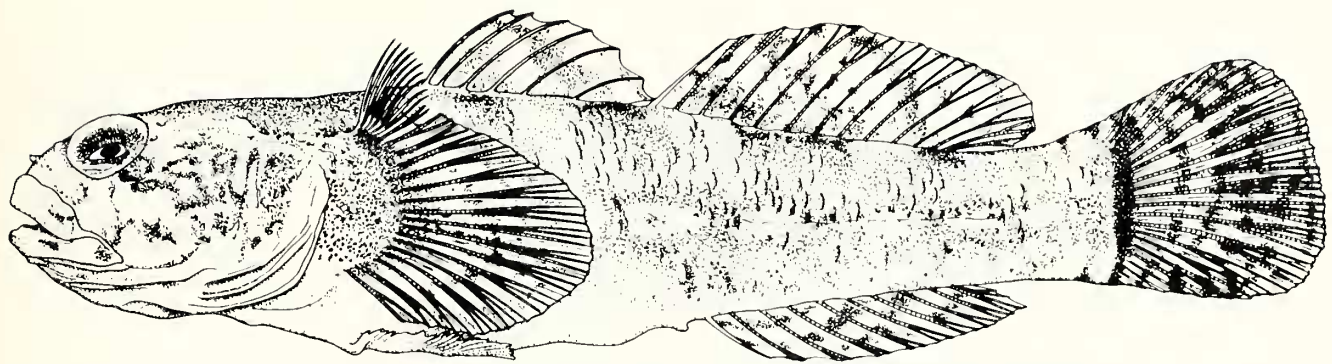


Figure 2. *Monishia adamsoni* n. sp. Holotype LACM 38320, SL 35.0 mm. Sind; Pakistan. Drawing by W. Ferguson.

fin little shorter than second dorsal fin, which is about two thirds of body depth. Anal fin inserted below second segmented ray. Pectoral fin rounded, reaching to below sixth dorsal spine. Pelvic fins fully united with a well-developed fraenum. Caudal fin rounded.

Scales. LS 31–33; TR 9–10. The body is covered with ctenoid scales except those on belly and three–four anterior rows on body which are cycloid. No scales on the median line of the belly, on predorsal, pectoral base, and prepelvic regions.

Color (preserved). Brownish, irregular dark speckles. A series of light spots along the midlateral scale row. First dorsal fin dark with upper margin white (about one quarter of its height). Second dorsal fin and anal fin dark with a light line along their edges. Pectoral fin dusky. Caudal fin with irregular vertical dark rows.

Monishia ochetica (Norman, 1927)

Figures 1c, 4c

Gobius ocheticus Norman, 1927:381, figs. 92–93. Type locality: Suez Canal.

Pomatoschistus (Ninnia) ocheticus: De Buen, 1930:132.

Coryphopterus ocheticus: Smith, 1959:211, pl. 93H.

Monishia ochetica: Miller, 1973:501; Miller, 1978:38–58.

Cabillus anchialinae Klausowitz, 1975:203–207.

Monishia anchialinae: Goren, 1979:46–48.

MATERIAL EXAMINED. BMNH 1925.9.19.114–123, (syntypes of *G. ocheticus*), 7 ex., TL 18.2–32.4 mm, SL 16.2–28.2 mm, Suez Canal, Lake Timsah, 1924; BMNH 1925.12.31.54–58 (syntypes of *G. ocheticus*), 4 ex., TL 21.5–33.0 mm, SL 18.2–27.0 mm, Suez Canal, 1924; SMF 13229 (holotype of *Cabillus anchialinae*), TL 41.1 mm, SL 33.4 mm; SMF 13230–13232 (paratypes of *C. anchialinae*), 3 ex., TL 26.7–34.5 mm, SL 23.2–28.6 mm, Sinai Peninsula, Cracks at Ras Muhammad (detailed description of the biotope in Por and Tournamal, 1973), VI.1972; TAU 7606, 5 ex., TL 33.1–51.0 mm, SL 28.0–45.7 mm, Cracks at Ras Muhammad, 16.X.1969; 26 ex., around Sinai Peninsula (detailed list in Goren, 1979, as *Monishia anchialinae*), TL 24.0–47.0 mm, SL 20.0–38.4 mm; HUJ E 62/532, Southern Red Sea, Nocra, 1 ex., TL 24.0 mm, SL 20.0 mm, 23.III.1962.

DIAGNOSIS. A *Monishia* with 10–11 segmented rays in second dorsal fin and 9–10 in anal fin; pectoral rays 16–18, upper 2 partly free; scales along body 23–31; transverse scale

Table 3. Selected body proportions of *M. ochetica*, *M. oculata*, *M. sordida*, *M. william*, and *M. bulejiensis*.

	<i>ochetica</i> n = 47	<i>oculata</i> n = 6	<i>sordida</i> n = 8	<i>william</i> n = 10	<i>bulejiensis</i> n = 5
Total length (mm)	24.0–51.0	15.5–25.6	32.7–43.3	27.8–41.2	31.3–38.1
Standard length (mm)	20.0–45.7	12.8–21.3	27.9–37.5	22.9–34.0	26.3–31.5
Standard length (% of TL)	81.0–84.2	81.4–83.2	82.2–86.8	81.5–83.9	82.5–84.0
Head length (% of SL)	27.8–30.5	27.9–29.1	29.6–32.9	29.4–30.2	28.5–30.4
Body depth (% of SL)	18.1–23.2	15.9–16.7	19.7–20.6	18.3–21.1	17.6–20.8
Distance between snout and first dorsal fin (% of SL)	34.2–36.8	35.4–37.4	35.3–36.5	36.1–37.6	35.4–39.0
Distance between snout and second dorsal fin (% of SL)	52.3–56.0	54.3–56.3	54.6–56.6	54.4–58.2	52.2–56.2
Distance between snout and anal fin (% of SL)	52.7–56.2	54.6–56.3	56.6–58.6	54.4–57.3	57.0–60.4
Head width (% of HL)	61.1–71.2	51.2–53.0	70.2–71.4	68.5–71.4	71.4–75.0
Eye diameter (% of HL)	25.4–30.1	25.0–26.0	25.0–26.1	24.2–25.0	25.0–27.5

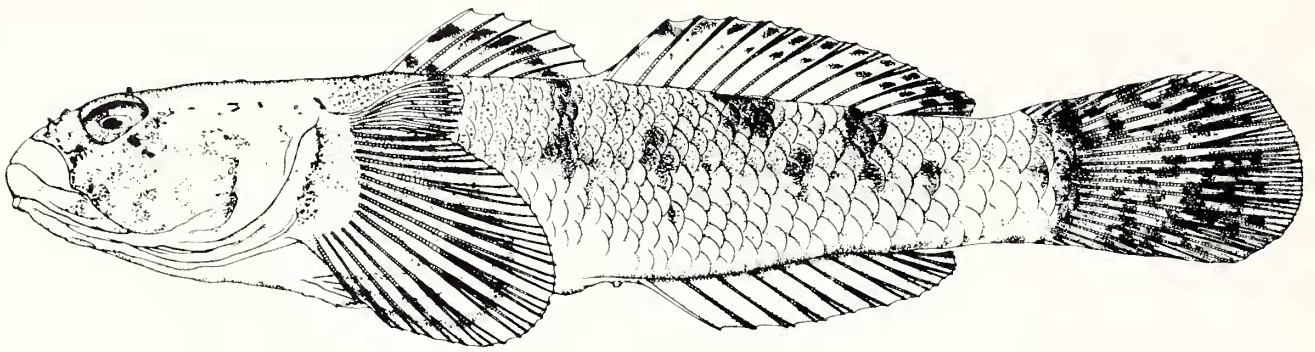


Figure 3. *Monishia bulejiensis* LACM 38310, SL 31.5 mm. Sind; Pakistan. Drawing by W. Ferguson.

rows 8–9; gill rakers 1+1+7. Comparisons are presented in Table 1.

DESCRIPTION (based on the above listed material). Body elongate and compressed. Head slightly depressed. Mouth small, oblique. Three–four rows of teeth on each jaw; outer teeth larger, inner a little curved backward. Tongue bilobed. Posterior nostril a very short tube, in front of eye. Anterior nostril tubular, close to upper lip. Interorbital space narrow, about one half pupil diameter. Gill opening restricted. Gill rakers 1+1+5–7, relatively short.

Cephalic lateral line system. Position and number of pores and papillae as in Figure 4c.

Body proportions presented in Table 3.

Fins. D VI, I 10–11; A I 9–10; P 16–18, 2 upper rays partly free. In the isolated population at the Cracks at Ras Muhammad (the type locality of *M. anchialinae*) two specimens were found with seven spines in first dorsal fin and 12 segmented dorsal rays. First dorsal fin high relative to that of the other *Monishia* species. Longest dorsal spines equal to body depth; second dorsal fin reaches almost the same height. Anal fin inserts below second dorsal segmented ray. Pectoral fins rounded, each to below the insertion of the second dorsal fin. Pelvic fins fully united. Fraenum weak. Caudal fin rounded.

Scales. LS 26–31; TR 8–9. Body covered with ctenoid scales except those on belly which are cycloid. The scales reach a line from the insertion of the first dorsal fin to the upper part of pectoral base. No scales on predorsal and pre-pelvic areas, and none on pectoral base.

Vertebrae. 27 including ural centrum (28 in 2 specimens from the Cracks at Ras Muhammad, not those with 7 spines or 12 segmented dorsal rays).

Color. Body and head brownish. Dark blotches along median line of the body. Irregular darker bands on body. Head darker than body. Back of the body and the upper part of head darker than the rest of the body. First dorsal fin with two large diagonal black bands. In several specimens the first dorsal fin is uniformly dark with its tip white. Second dorsal fin and anal fin dusky with white edges. Pelvic fins dark. Caudal fin with vertical irregular lines of dark spots.

REMARKS. In a previous paper (Goren, 1979) I noted that *M. anchialinae* is in fact a synonym of *M. ochetica*, but I left the two species separate as I had some hesitation that

arose from apparently contradictory information concerning the habitats of the two nominal species. A further study in which fresh material from the Cracks at Ras Muhammad was included, as well as many observations in the Red Sea during the last four years, settled the question. These fish were observed always on or near hard substratum which in most of the occasions was located in sandy areas. In certain cases it was a small coral knoll, but usually the fish were observed in or near small coral heads, mollusk shells, and even artificial objects such as bottles and tins. The fish searched for food on the sand in close proximity to the hard substratum and hid in holes when disturbed. I conclude that when specimens of *M. ochetica* were collected from what seemed to be soft bottom, hard substratum was actually part of the habitat. Thus, on the basis of these new observations and additional examinations of material, I regard *M. anchialinae* as a junior synonym of *M. ochetica*.

Monishia oculata Smith, 1959

Figures 1d, 4d

Monishia oculata Smith, 1959:206. Type locality: Mahé; Miller, 1978:56.

MATERIAL EXAMINED. RUSI 830, paratypes, 3 ex., TL ?, SL 15.3–20.5 mm, Baixo Pinda, 10.IX.1956; RUSI 74-95 (part), 3 ex., TL 15.5–25.9 mm, SL 12.8–21.3 mm, Beauchamp, 1 mile E on road near Jacotet Bay, 0.3 miles E of St. Marie Bridge at jutting head of island, 6.III.1971.

DIAGNOSIS. A *Monishia* with a wide dark band from eye to lower edge of preopercle. Second dorsal fin with 9 segmented rays. Anal fin with 8 segmented rays; pectoral rays 17–18, upper 3–4 free; scales along body 30–33; transverse scale rows 11; first gill slit closed by a membrane. *M. oculata* can be distinguished from all its congeners by a diagonal dark band below eye. Comparisons are presented in Table 1.

DESCRIPTION (based on the above listed material). Body elongate and compressed. Head depressed. Mouth little oblique. Maxillae to level of mid eye. Three to four rows of teeth on each jaw. Outer teeth enlarged. The two lateral pairs of teeth in the inner row of the lower jaw are caniniform. Tongue bilobed. Posterior nostril a short tube, in front of eye. Anterior nostril tube above lip. No flaps on nostrils. Gill

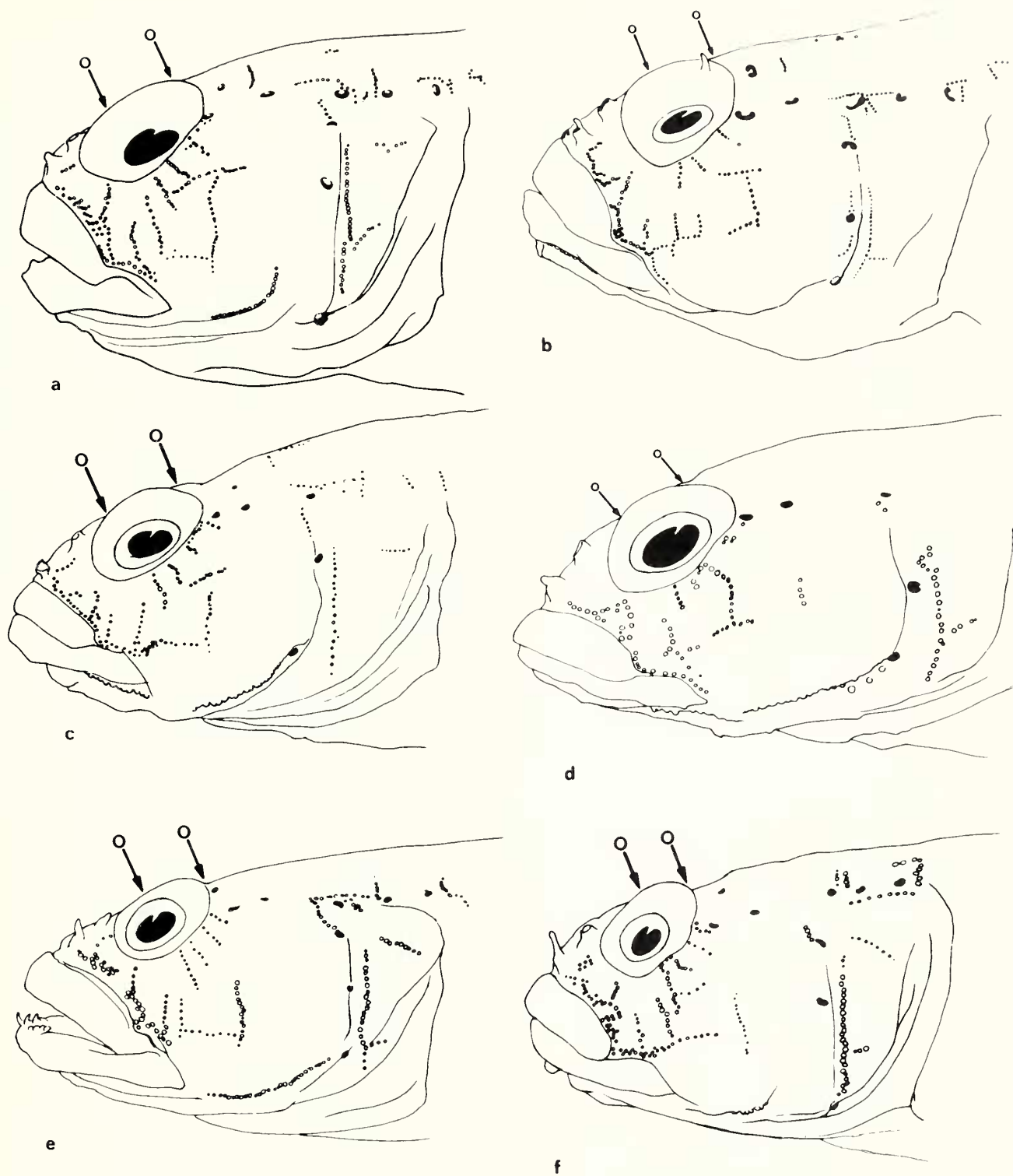


Figure 4. Lateral line sensory papillae and canal pores in six species of *Monishia*. a) *M. adamsoni* n. sp. Holotype LACM 38320. Sind; Pakistan. b) *M. bulejiensis* LACM 38310. Sind; Pakistan. c) *M. ochetica* TAU 7606, Ras Muhammad, Sinai Peninsula. d) *M. oculata* RUSI 830 (Paratype). Baixo Pinda. e) *M. sordida* RUSI 823 (Paratype). Inhaca Islands. f) *M. william* TAU 8803 (formerly RUSI 74-329). Coffee Bay. Drawing by W. Ferguson.

opening restricted. First gill slit closed by a membrane. Gill rakers 1+1+4, very short.

Vertebrae (including ural centrum). 27.

Cephalic lateral line system. As shown in Figure 4d.

Body proportions are presented in Table 3.

Fins. D VI, I 9; A I 8; P 17–18, upper 3–4 rays free. Dorsal fin height less than body depth. Pectoral fins rounded, reaching to below second dorsal segmented rays. Upper pelvic rays free. Pelvic fins fully united, almost reaching the anus. Fraenum developed. Caudal fin rounded.

Scales. LS 30–33; TR 11. Ctenoid scales on body, reaching to a line from second dorsal spine to upper part of pectoral base. No scales on mid belly, pectoral base, prepelvic and predorsal regions.

Color (preserved). Body yellowish with four vertical wide and irregular brown bands; that on caudal base much darker. A dark wide band runs from eye down and backward to preopercle margin. Two oblique dark bands on first dorsal fin. Dark spots form irregular vertical lines on second dorsal and anal fins. Pelvic fins colorless to dark. Caudal fin colorless.

Monishia sordida Smith, 1959

Figures 1e, 4e

Monishia sordida Smith, 1959:206–207. Type locality: Inhaca; Miller, 1978:55–56.

MATERIAL EXAMINED. RUSI 823, paratypes, 3 ex., TL 38.1–43.3 mm, SL 32.3–37.5 mm, Mozambique, Inhaca Islands, VIII.1948; TAU 8802 (out of RUSI 3018), 5 ex., TL 32.7–41.7 mm, SL 27.9–34.0 mm, Mozambique, Lourenco Marques, Ponte Maone, X.1953.

DIAGNOSIS. A *Monishia* with 2–3 vertical rows of scales on pectoral base; scales along the body 34–36, transverse scale rows 12–13; segmented rays in second dorsal fin 11 and in anal fin 9; pectoral rays 21–22, the upper 5 free. *Monishia sordida* differs from all its congeners in having scales on pectoral base. Comparisons are presented in Table 1.

DESCRIPTION (based on the above listed material). Body elongate and compressed. Head depressed. Snout convex, little shorter than eye diameter. Mouth oblique. Maxillae reach to level of mid eye, 3–4 rows of teeth on each jaw, the outer enlarged. At the middle of the inner row of the upper jaw two large canines directed backward. Two to three curved canines on each side of inner row on lower jaw. Tongue slightly emarginate. Posterior nostril a short tube at the front of eye. Anterior nostril, a tube with a flap, hanging above lip. Gill opening restricted. Gill rakers relatively long, 1+1+6.

Vertebrae (including ural centrum). 27.

Cephalic lateral line system. As in Figure 4e.

Body proportions presented in Table 3.

Fins. D VI, I 11; A I 9; P 22 (5 free). The two dorsal fins are the same height, which is about two thirds of body depth. Pectoral fins rounded, reaching to below insertion of second dorsal fin. Pelvic fins fully united with a weak fraenum. The pelvis reach 65–80 percent of the distance between the anus and the pelvic fin base. Caudal fin rounded.

Scales. LS 34–36; TR 12–13. The body covered with scales

posteriorly from a line from the first dorsal fin insertion to the upper base of the pectoral fin. Scales in the anterior 2–3 transverse rows are cycloid, the rest are ctenoid. Belly and pectoral base covered with cycloid scales. No scales on prepelvic and predorsal regions.

Color (preserved). Body brownish. A black blotch on the upper part of the pectoral base. Two wide diagonal dark bands on first dorsal fin. Dark dots form diagonal lines on the second dorsal fin and vertical lines on the caudal fin.

REMARKS. Winterbottom (1976) found prepelvic scales in some specimens of *M. sordida* “(Not in all individuals),” but I found none.

Monishia william (Smith, 1947)

Figures 1f, 4f

Bathygobius william Smith, 1947:340. Type locality: Xora River Mouth, Transkei (lectotype by Winterbottom, 1976). *Monishia william*: Smith, 1959:206–207; Winterbottom, 1976:1–11; Miller, 1978:49–56.

MATERIAL EXAMINED. RUSI 74-348, 1 ex., TL 39.0 mm, SL 32.5 mm, Chaka's Rocks, Natal, 3.IX.1974; RUSI 77-12, 2 ex., TL 34.1–37.5 mm, SL 27.8–30.5 mm, Port Edward, 31.V.1977; RUSI 74-322, 2 ex., TL 27.8–28.8 mm, SL 22.9–23.4 mm, Tshani, Transkei, VIII.1974; TAU 8803 (formerly RUSI 74-329), 5 ex., TL 32.5–41.2, SL 27.0–34.0 mm, Coffee Bay, 6.VIII.1974.

DIAGNOSIS. A *Monishia* with 11 (rarely 10) segmented rays in second dorsal fin and 9 in anal fin. Scales along body 34–36; transverse scale rows 9–10; pectoral fin with 22–23 rays, upper 6–7 free; first gill slit closed by a membrane; gill rakers very short (1+1+4). Comparisons are presented in Table 1.

DESCRIPTION (based on the above listed material). Body elongate and compressed. Head slightly depressed. Snout oblique-convex. Posterior nostril a short tube in front of eye. Anterior nostril a moderate tube (about one third diameter of pupil) with a skin flap at its hind margin. Mouth little oblique. Maxillae reach to below mid eye. Two to three rows of teeth on both jaws. Outer teeth on upper and lower jaws enlarged and pointed. A pair of canines at the side of the lower jaw. Tongue rounded. Interorbital space narrow, about one third diameter of pupil. Gill opening restricted, reaching lower part of pectoral base. First gill slit closed by a membrane. Gill rakers short, 1+1+4.

Vertebrae (including ural centrum). 27.

Cephalic lateral line system. As in Figure 4f.

Body proportions presented in Table 3.

Fins. D VI, I 11 (10 in one); A I 9; P 22–23, the upper 6 or 7 rays free. Dorsal fins of equal height; longer spines and rays reach about two thirds of body depth. Second dorsal fin inserting above anus. Anal fin inserting below second dorsal segmented ray, its height about two thirds of body depth. Pectoral fins rounded, reaching to below insertion of second dorsal fin. Pelvic fins fully united, fraenum well developed. Caudal fin rounded.

Scales. LS 34–36; TR 9–10. Body covered with scales to a line from insertion of first dorsal fin to upper base of pec-

toral fin. Scales in anterior 3–4 transverse rows and those on belly are cycloid, the rest are ctenoid. Mid belly, pectoral bases, and predorsal and prepelvic regions unscaled.

Color (preserved). Body brownish with 4–6 irregular dark vertical bands. Black blotches along median line of body. Dark vertical half-moon blotch on the base of the caudal fin. A dark blotch on the upper part of the pectoral base; first dorsal fin with two diagonal wide dark bands. Rows of black spots form vertical lines on the caudal fin and diagonal lines on second dorsal and anal fin.

Remarks. The counts presented in this work are very close to those given in the original description of *M. william* (Smith, 1947) but differ from those given in subsequent publications (Smith, 1959, 1960). The reason for this discrepancy is the inclusion of specimens of *Bathygobius fuscus* in the material of *M. william* as found by Winterbottom (1976).

ACKNOWLEDGMENTS

I am grateful to T.A. Adamson (formerly LACM) for providing the material from Pakistan and to Professor M.M. Smith (RUSI) for providing material from South Africa. Finally, I thank Dr. A. Freidberg for reviewing this paper.

LITERATURE CITED

- De Buen, F. 1930. Sur une collection de Gobiinae provenant du Maroc. Essai de synopsis des espèces de l'Europe. *Bulletin de la Société des Sciences Naturelles du Maroc* 10:120–47.
- Goren, M. 1979. The Gobiinae of the Red Sea (Pisces: Gobiidae). *Senckenbergiana Biologica* 60(1/2):13–64.
- Hoda, S.M.S. 1983a. A new species of gobiid fish *Monishia bulejiensis* (Family: Gobiidae) from the Coast of Pakistan. *Biologia* 29(1):114–15.
- . 1983b. A new species of gobiid fish *Monishia bulejiensis* (Teleostei: Gobiidae) from the Karachi coast. *Indian Journal of Fisheries* 30(1):143–47.
- Hoesel, D. F., and R. Winterbottom. 1979. A new species of *Liotes* (Pisces, Gobiidae) from Kwazulu, with a revised checklist of the South African gobies and comments on the generic relationship and endemism of Eastern Indian Ocean gobioids. *Royal Ontario Museum Life Sciences. Occasional Papers* 31:1–13.
- Klausewitz, W. 1975. *Cabillus anchialinae*, eine neue Meergrundel von der Sinai-Halbinsel (Pisces: Gobiidae: Gobiinae). *Senckenbergiana Biologica* 56(4/6):203–07.
- Miller, P.J. 1973. Gobiidae. In *Check list of the fishes of the North-Eastern Atlantic and of the Mediterranean* 1: 483–515.
- . 1978. The systematic position and origin of *Gobius ocheticus* Norman, 1927, from the Suez Canal. *Zoological Journal of the Linnean Society* 62:39–58.
- Norman, J.R. 1927. Zoological results of the Cambridge Expedition to the Suez Canal, 1924. Fishes. *Transactions of the Zoological Society of London* 22:375–89.
- Por, F.D., and M. Tsumamal. 1973. Ecology of the Ras Muhammad Cracks in Sinai. *Nature* 241(5384):43–44.
- Smith, J.L.B. 1947. Brief revision and new records of South African marine fishes. *Annals and Magazine of Natural History* 14(11):335–46.
- . 1959. Gobioid fishes of the families Gobiidae, Periophthalmidae, Trypauchenidae, Taenioididae and Kraemeriidae of the Western Indian Ocean. *Ichthyological Bulletin* 13:185–225.
- . 1960. Fishes of the family Gobiidae in South Africa. *Ichthyological Bulletin* 18:299–314.
- Talbot, F.H., and M.L. Penrith. 1956. *Ctenogobius cloatus* Smith, 1960, a synonym of *Ctenogobius saldanha* (Barnard, 1927). *Annals of the South African Museum* 48: 189–93.
- Winterbottom, R. 1976. Notes of South African gobies possessing free upper pectoral fin rays (Pisces: Gobiidae). *J.L.B. Smith Institute of Ichthyology. Special Publication* 16:1–11.

Accepted 5 October 1984.